

Farm Cove, a bay in the famous harbour of Port Jackson. The collections of cycads and conifers, including nearly a dozen species of both Macrozamia and Podocarpus, are particularly noteworthy. The plan adopted in the "Guide" is to give a list of the important plants to be found in each bed, with brief notes on native and the more interesting foreign species.

Two handy little publications have been issued by Messrs. James Woolley, Sons, and Co., Ltd., of Manchester. One, known as the "Science Teacher's Pocket Book and Diary, 1903-4," costs a shilling, and the other, the "Science Student's Note Book, 1903-4," costs 6d. Both books contain about forty pages of useful constants in physical and chemical science, together with other numbers in constant use in the laboratory.

MESSRS. ASTON AND MANDER are now manufacturing for the use of technical and other schools drawing instruments provided with several useful improvements. The adjusting screws cannot be detached from the instruments, and so be lost, the inking-in pens are easily cleaned, and a patent hook-and-nut method of holding the needles effectually prevents breakages when clamping, and renders it easy to change the needles.

SEVERAL volumes of the first annual issue of the "International Catalogue of Scientific Literature" have recently been received. The volume on chemistry (part ii.) contains 671 pages, referring to papers published since the end of 1900. The literature published in 1901, together with a portion of that published in 1902, is catalogued in the volumes on palæontology, general biology, human anatomy, physical anthropology, and physiology (part ii.); the last volume includes papers on experimental psychology, pharmacology, and experimental pathology, and occupies 664 pages.

COPIES have been received of the last two half-yearly volumes—xxxii. and xxxiii.—of the *Journal* of the Anthropological Institute of Great Britain and Ireland. Among numerous other important contributions, the earlier volume contains the Huxley lecture for 1902, on right-handedness and left-brainedness, by Prof. D. J. Cunningham, F.R.S. The more recent volume includes the address by the president, Dr. A. C. Haddon, F.R.S., delivered at the annual general meeting of the Institute in January last. The volumes are profusely illustrated with beautifully reproduced plates, and serve to show the excellent work the Institute is doing. Similar researches are, in the United States and elsewhere, liberally subsidised by the State, but the Anthropological Institute, working without such support, is enriching the Empire by collecting and publishing a mass of well-arranged information of which any scientific department might legitimately be proud.

THE additions to the Zoological Society's Gardens during the past week include a Chimpanzee (*Anthropopithecus troglodytes*) from the Albert Nyanza, a Patas Monkey (*Cercopithecus patas*) from Gondokoro, presented by Colonel Bruce; two Geoffroy's Cats (*Felis geoffroyi*) from Chaco, Argentina, presented by Mr. A. C. Crewe; a Puma (*Felis concolor*), two Vicunas (*Lama vicugna*), a Condor (*Sarcorhamphus gryphus*) from Puna de Jujuy, presented by Baron Ott; a Rosy-faced Love-bird (*Agapornis roseicollis*) from South Africa, presented by Mrs. Healey; a Mandarin Duck (*Æx galericulata*) from China, presented by Mrs. Balston; two Wagler's Pit Vipers (*Lachesis wagneri*) from Singapore, presented by Mr. A. Herbert; a Back-marked Snake (*Coluber scalaris*), European, presented

by Mr. W. A. Harding; four Horned Lizards (*Phrynosoma cornutum*) from Colorado, presented by Mr. Edwin Webb; two Carinated Lizards (*Lioccephalus carinatus*) from the West Indies, five Hispid Lizards (*Agama hispida*) from South Africa, five Round-spotted Lizards (*Stenodactylus guttatus*) from North Africa, five Black-spotted Lizards (*Algiroides nigropunctatus*) from the Borders of the Adriatic, two Wall Lizards (*Lacerta muralis*, var. *genoi*), two Wall Lizards (*Lacerta muralis*, var. *badriagoe*) from Corsica, two Alaska Geese (*Bernicla minima*) from the Pacific Coast, deposited.

### OUR ASTRONOMICAL COLUMN.

THE ROTATION OF SATURN.—Writing to the October number of the *Observatory*, Herr Leo Brenner states that the rotation period of Barnard's large white spot on Saturn, as deduced from his observations, is *exactly* 10h. 38m., and that this value is rigidly confirmed by the observations of other German observers.

This period exactly agrees with that obtained by Mr. Denning as a mean of all the published observations, and, as that observer points out in a communication to the above-named journal, it indicates that the various belts and zones on Saturn have different rotation periods in a manner similar to those of Jupiter.

The recent disturbances on Saturn have now practically subsided, and can only be seen with the larger instruments.

THE BROADENING OF SPECTRAL LINES.—In a paper communicated to No. 34 vol. vi. of the *Philosophical Magazine* Mr. G. W. Walker discusses the causes which lead to the asymmetrical widening of spectral lines.

Taking it for granted that near to a luminous source, whether the luminosity be produced by electricity or by flame at high temperature, there must be a number of free negatively charged particles, he proceeds to show how these particles may modify the light which they receive, and again scatter it in a manner quite different to that obtaining in the "Doppler" or in any "damping" effect. These charged particles, under the influence of the plane waves, will then vibrate with a period different from that of the incident waves; thus, instead of homogeneous light, there will be a portion of the light scattered by the charged particles, and this portion will have a longer wave-length than the original light, its intensity varying in proportion to the number of freely charged particles present. This, however, does not account for those rare cases where the broadening takes place on the violet side of the normal line. To explain these cases Mr. Walker suggests that the continuous streams of charged particles will set up a magnetic field which may produce the Zeeman effect, in which Zeeman has frequently noted asymmetrical broadening towards the violet. Where this latter effect is greater than the former, then the broadening takes place on the violet edge of the original line.

THE SPECTRUM OF HYDROGEN.—With the purpose of elucidating the connection between the "four-line" spectrum and the "many-line" spectrum of hydrogen, Mr. Louis A. Parsons, of the Johns Hopkins University, has made a series of experiments dealing with the spectrum of hydrogen obtained under many various conditions, and has embodied his results in a paper communicated to No. 2 vol. xviii. of the *Astrophysical Journal*.

After discussing the various theories which have previously been put forward in explanation of the phenomena, and dealing especially with that of Prof. Trowbridge, who supposes that the line spectrum is due to water vapour, and not to hydrogen pure and simple, Mr. Parsons describes the various pieces of apparatus he used and the experiments he performed, and then summarises his results in the following conclusions:—(1) The compound spectrum never occurs without the line spectrum, although the latter may occur alone at high pressures; (2) the line spectrum is characteristic of an abruptly oscillatory discharge, whilst the compound spectrum is produced by the continuous discharge; (3) the line spectrum may be produced by high temperatures occurring *locally* at points where the disruptive dis-

charge occurs, but it is not due to the high temperature of the gas considered as a whole.

In regard to the fourth point, viz. the action of water vapour in producing the line spectrum, the experiments showed that the presence of moisture is an important factor in the production of this type of spectrum, but they do not lead to Prof. Trowbridge's conclusion that it is the spectrum of water vapour. Mr. Parsons is inclined to believe that the ionisation of the atoms, as they enter or leave the water molecule, may set up a distinct local oscillatory discharge, which he previously shows to be necessary for the production of the line spectrum.

THE ORBIT OF  $\xi$  BOÖTIS.—In a previous computation of the orbit of  $\xi$  Boötis, by Prof. W. Doberck, the elements obtained represented the observed angles up to the year 1888, but did not faithfully represent the observed distances for some time prior to that (*Astronomische Nachrichten*, No. 2129). It now appears that the angles might be represented by orbits having widely differing periods, so the same observer has recomputed the elements, mainly using the measured distances as is done in the case of  $\eta$  Cassiopeia. Using Thiele's method, which he recommends especially in the case of very eccentric orbits, he obtained the following elements, referred to the equinox of 1900-0, from normal places for 1836.5, 1876.5, and 1896.5 (*Astr. Nach.*, No. 3900):—

$\Omega = 183^\circ 8'$	$P = 140^{\circ}84 \text{ years.}$
$A = 314 \quad 6$	$T = 1907.10$
$\gamma = 46 \quad 8$	$a = 5''.115$
$e = 0.6163$	Retrograde.

In the *Memorie* of the Italian Spectroscopists' Society Mr. G. Boccardi gives a list of errata in various star catalogues and trigonometric tables which he discovered in the course of compiling the catalogue of stars of reference in the zone  $46^\circ$  to  $55^\circ$ , published by the Observatory of Catania. In addition, the same writer gives corrections for the ephemerides of the asteroid 292 Ludovica. An Italian translation, by Mr. A. Mascari, of Dr. W. J. S. Lockyer's paper on a probable relation between the solar protuberances and the corona is also published in the *Memorie* of the Society.

#### OPENING OF THE MEDICAL SCHOOLS.

AS usual at this time of the year, introductory addresses have been delivered during the past week at the opening of the various medical schools in different parts of the country. Some of these addresses are summarised below.

At the opening of the medical session at University College, London, on Monday, Prof. F. H. Starling, F.R.S., pleaded for the establishment of a post-graduate school of medicine. He remarked that the crying need at the present time was clinical research, which must be carried out in hospitals by men trained in scientific methods and willing to spend laborious days in their application to the problems of disease. The absence of workers who might utilise to the full the great mass of material presented by our hospitals was due to two factors, namely, the absence of academic ideals in London, and the lack of any adequate provision which might enable our best men to devote their early years to the advance of their profession by conscientious study and research. Prof. Starling advocated the foundation, in the University of London, of a school specially devoted to the advancement of medicine. Such post-graduate school must be in connection with a hospital, and might be founded by a modification of one of the existing medical schools, or be created *de novo* in connection with some general hospital. Forming part of the school should be laboratories for experimental physiology and pathology, for bacteriology, for medical chemistry, and for normal and morbid histology. In addition to the experimental department, there should be, preferably in the hospital building itself, a series of observational laboratories, where the conditions of the patients could be investigated with a scientific precision. Such a school could detract in no way from the present advantages of our medical schools, but would rather add to their efficiency.

Sir Victor Horsley delivered an address on the subject of university education at the University of Birmingham on

Monday. In the course of his remarks he urged the necessity for a multiplication of universities, and deprecated Sir W. Anson's dictum that what was wanted before universities was "an intelligent population." Under the present Government the whole direction of the Education Department had been placed in the hands of those whose ideas were regulated by the sterile training in dead languages and somewhat moribund systems of philosophy, unfortunately characteristic of an old university like Oxford. It did not seem to have occurred to the Parliamentary Secretary to the Board of Education that to the ordinary person the more obvious way of obtaining an intelligent population was to provide them with the highest and best means of educating themselves, and to increase and multiply those means in the midst of each populous district. It seemed to him shocking that the leading expert of the Education Department should hostilely attack not merely the present evolution of universities, but also the very earnest and carefully thought out propositions which the president of the British Association recently put forward with fresh force and interest. It had been reserved for Sir William Anson to raise the barren and worn-out strife between classical and scientific education. How could the physical science laboratories of our universities be considered to be too favoured by public opinion, as Sir William asserted, when their equipment and buildings left so much to be desired, and their endowments were so meagre that some 24 millions, it was estimated, must be expended to bring them into line with the universities of America? It was most unfortunate for the nation that the educational policy of the present Government was directed by officials holding such reactionary views. Let them hope that when the greatest statesman of our generation was placed by the country in his proper position as Prime Minister and leader of the nation a change would come over the spirit of the Education Department. The nation was under the delusion that universities flourished, first, on private endowments and benevolence; and, secondly, on the fees of students. Legislation to provide State aid for the universities was a duty which pressed heavily on a Government which did nothing to protect the people from the injury of drink and the waste of money which the drinking habit entailed. He suggested that the universities should cooperate in pressing a definite programme of State aid.

The first autumn term of the faculty of medicine at the University of Liverpool was inaugurated by Sir Dyce Duckworth, who, during an address on reverence and hopefulness in medicine, told the students that to equip themselves fittingly for the profession of medicine would demand some knowledge of the several sciences on which the science and art of medicine are based. Those who have had experience as examiners know well the difference, said Sir Dyce Duckworth, between candidates who have had the benefit of a liberal education before they entered upon medical study, and those who, although showing aptitude, have not had that advantage. It is the difference between efficiency and expertness, between width and narrowness.

Dr. J. W. Swan, F.R.S., gave the introductory address to the school of pharmacy of the Pharmaceutical Society. The events of the last sixty years, he said, showed conclusively that our want of thoroughness in education and the consequent want of imagination and capacity to appreciate the value of scientific research had caused us immense national loss. Dr. Elizabeth M. Pace, in addressing the students of the London School of Medicine for Women in connection with the Royal Free Hospital, gave an interesting historical sketch of the growth of facilities for the medical education of women during the last sixty years. At the Middlesex Hospital Mr. Justice Wills presided at the opening of the session, and Mr. William Hern, in welcoming the new students, pointed out that one of the great differences between the medical methods of past and present times was the substitution for the old empiricism, of treatment based upon an inquiry into the causes of disease. Mr. J. A. Bloxam, in the inaugural address at the Royal Veterinary College, told the students that if veterinary education was to march with the times, and if this country was to bear its part in the advancement of veterinary knowledge in the future, the State must follow the example set by other countries and contribute handsomely to the equipment and upkeep of the veterinary schools.